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10/727,764	12/03/2003	H. Grant Wang	30302/014252	7578

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EXAMINER
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HOLZEN, STEPHEN A

ART UNIT	PAPER NUMBER
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3644

DATE MAILED: 07/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/727,764

Applicant(s)

WANG ET AL.

Examiner

Stephen A. Holzen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 31 May 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-24 and 27-32 is/are pending in the application.
- 4a) Of the above claim(s) 6-15, 18-20 and 29-32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 16, 17, 21-24, 27, and 28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments, see response, filed 2/22/2005, with respect to the rejection(s) of the claim(s) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn.

2. The applicant has argued that Xing does not disclose a "unified sensor set" however has not specifically defined what all is meant and encompassed by the word "unified". In fact the applicant has stated in the disclosure that the unified sensor set comprise one of

- a. At least one star tracker
- b. A plurality of star trackers and inertia measurement units
- c. A plurality of star trackers, gyros and solar panels

See page 6, lines 10-22 of the specification. Since the applicant has elected embodiment "a" the examiner views the limitation "unified sensor set" to mean "at least one star tracker" working together (unified) that determines attitude.

3. The examiner agrees with the applicant's arguments that Xing does not disclose more than one star tracker. Therefore this rejection has been withdrawn.

### ***Election/Restrictions***

4. Applicant has elected species "a" and "x". Species "a" is drawn to a unified attitude sensor comprised of at least one star tracker only, and does not include any

inertial measurement units. Further the applicant has elected species "x", that reads on claims 16 and 17.

5. The applicant has asserted that most of the claims are generic to the elected species. The examiner disagrees with the applicant's assertion. The examiner has determined that claims 1-5, 16, 17, 21-24, 27, and 28 are the only claims that read on "a plurality of star trackers as the sole source of attitude sensor data" and "a bi-propellant transfer orbit operation."

6. Claims 6-15, 18-20, and 29-32 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 5/31/2005.

### ***Claim Rejections - 35 USC § 112***

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 1-5, 16, 17, and 21-24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The applicant has not specifically defined what is meant by the word "unified" and one of ordinary skill in the art would not know what all is meant and

encompassed by the word "unified". The claims fail to comply with the enablement requirement therefor since they contain subject matter not described in such a way to enable one skilled in the art to make a "unified" sensor set. Does "unified" mean that the "at least one star trackers" are mechanically coupled together, or that they are sending signals simultaneously?

9. Claims 1-5, 16, 17, 21-24, 27 and 28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The applicant has not disclosed what is meant by the phrase "all phases of operations". Does this include the launching of the satellite into space and testing of the satellite on the earth? These two examples are part of the spacecraft "operations" although clearly the applicant has not intended the sensor set to be operational while the satellite is still on earth, or in transit to space. The claims lack enablement therefor since one of ordinary skill in the art, would not be capable of using the spacecraft sensor set during every single operation the satellite.

10. Claims 1-5, 16, 17, and 21-24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make

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and/or use the invention. The applicant claims that the processor is capable of "controlling attitude" of the spacecraft using solely the unified attitude sensor set. However sensors cannot be manipulated to "control" the attitude, only determine it. To control the attitude thrusters or momentum wheels would be required. One of ordinary skill in the art would not be able to use the claimed invention.

11. Claim 4 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The applicant has claimed a "spacecraft rate", however does not disclose what "rate" is being determined. One of ordinary skill in the art would not be capable of determining a "spacecraft rate" since the "rate" is not defined.

12. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

13. Claims 1-5, 16, 17, 21-24, 27 and 28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

d. The term "unified" in claim 1 is a relative term, which renders the claim indefinite. The term "unified" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary

skill in the art would not be reasonably apprised of the scope of the invention.

The examiner cannot determine what is meant by and encompassed by the word "unified".

e. Regarding Claim 1: The examiner cannot determine how the applicant is "controlling" the attitude of the spacecraft with the use of star tracking sensors solely. Thrusters or other actuators are usually required to move the spacecraft.

f. Regarding claim 4: The examiner cannot determine what "rate" the applicant is determining.

g. Re – Claim 5: The applicant has not specifically claimed a "bi-propellant" engine. The claim is indefinite since the examiner cannot determine if the applicant is only claiming the "type of operation" or is further defining a means for controlling the spacecraft. Is this an "operation" or an "engine" limitation?

h. Re – Claims 1 and 27: The examiner cannot determine what all is meant and encompassed by the phrase "all phases of spacecraft operation". Does this mean only "in space operations", or does this phrase include operations on earth, prior to deployment; such as testing operations, and earth-to-space transferring operations?

### ***Claim Rejections - 35 USC § 102***

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) The invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

15. Claims 1-5, 16, 21, 22, 24, 27 and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Needelman (6,266,616).

Re – Claims 1 and 27: Needelman discloses a spacecraft having a unified attitude sensor set that is adapted for use during all phases of spacecraft operations (#218; “one or more star sensors” – Col. 4, line 7; “star sensors” – Col. 6, lines 30-31), a process (202; space control processor that controls all operations of the spacecraft see col. 3, lines 47-50) capable of determining and controlling attitude of said spacecraft during said operations solely using sensor inputs from the unified attitude sensor set. (Satellite 100 includes one or more star trackers sensors to measure attitude see Col.3, lines 15-17),

Re – Claim 2: wherein the unified attitude sensor set includes at least one star tracker (#218)

Re – claims 3 and 28: wherein the star tracker data is used to determine spacecraft attitude for transfer orbit operations and on-station operations (col. 3, lines 47-48)

Re – Claim 4: wherein the star tracker data is used at least in part to determine spacecraft rate (inherent that data is used to determine “rate” where the spacecraft control system is tracking attitude changes.)

Re – Claim 5: wherein star tracker data is used at least in part to determine spacecraft attitude (see Col.3, lines 15-17)



Re – Claim 16: wherein the spacecraft operations include transfer orbit operations and on-station operations (see Col. 3, lines 47-55)

Re – Claim 21: wherein the process included electronic hardware (#202, “SCP” inherently has electronic hardware)

Re – Claim 22: wherein the processor includes software (#202 has RAM and an operating system 272, see col.4, lines 65+)

Re – claim 24: wherein the spacecraft has its solar wings deployed (see Figure 1, #104N)

### ***Claim Rejections - 35 USC § 103***

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Needelman (6,266,616) in view of Smith (4,787,578). Needelman disclose every aspect of the present invention except wherein the transfer orbit operations include a bi-propellant engine for transferring orbits. Smith however discloses that it is well known in the art to design a spacecraft with a bi-propellant system (see Figure 1 and Col. 1, lines 28-31). It would have been obvious to one having ordinary skill in the art, at the time the invention was made to use a bi-propellant engine for an orbit transfer operation since bi-propellant systems provide a high degree of precision.

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18. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Needelman in view of Bertheux et al (5,653,407). Needelman discloses every aspect of the present invention except wherein the solar panel wings are stowable. Bertheux et al discloses a spacecraft having solar wings that are capable of being deployed and stowed. (See Col. 3, lines 45-56). It would have been obvious to one having ordinary skill in the art, at the time the invention was made to employ solar panel wings that are deployable since the stowed configuration is convenient for launching the satellite into space, while the deployed configuration is convenient for collecting energy from the sun.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen A. Holzen whose telephone number is 571-272-6903. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Teri Luu can be reached on 571-272-7045. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sah



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